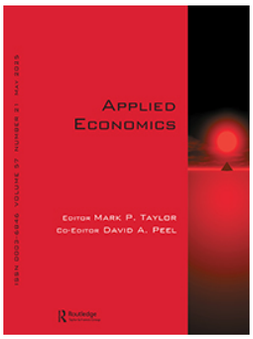

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Cooperative credit banks and economic fluctuations: the Italian case

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ABSTRACT

This paper analyses lending behaviour and economic fluctuations in the Italian banking system as a whole and in the case of the Cooperative Credit Banks (CCBs) and Joint Stock Banks using time series data from 2000Q1 to 2022Q4. The specified models include the main determinants of loans to households and firms. In the first stage, VECMs are estimated to identify the long-run relationship between credit and economic variables. In the second, on the basis of appropriate exogeneity tests, only the credit variables are treated as endogenous, and all others as exogenous. Specifically. ECMs are estimated for both loans to households and loans to firms by all banks as well as from the CCBs and Joint Stock Banks. The results suggest that lending behaviour is less affected by economic fluctuations in the case of the CCBs, namely these tend to reduce credit by less or not at all during economic downturns. The reason is that relationship lending enables CCBs to gather confidential (non-public) information about their clients, which can aid lending decisions and reduce credit rationing during such phases.

KEYWORDS

Cooperative credit banks; bank lending; financial systems; economic cycles

JEL CLASSIFICATION

G01; G21

I. Introduction

In recent decades, the financial sector has significantly influenced macroeconomic outcomes in various countries. In particular, its procyclicality appears to have amplified swings in the real economy. A common explanation for this phenomenon focuses on information asymmetries between borrowers and lenders. During economic downturns, when collateral values are low, even borrowers with profitable projects may struggle to obtain funding owing to information asymmetries. By contrast, as economic conditions improve and collateral values rise, these become able to access external finance, thereby contributing to the economic recovery. In this context, Cooperative Credit Banks (CCBs) could play a crucial role in mitigating the effects of the economic cycle on credit supply, especially during recessions, thanks to their distinctive business model and governance. Owing to their long-term relationships with firms, entrepreneurs, households, and local communities, CCBs are able to collect a greater amount of (soft) information about each borrower and their relevant markets. This helps to reduce information asymmetries often resulting in credit rationing, particularly during economic downturns.

This paper analyses lending behaviour and economic fluctuations in the Italian banking system as a whole and in the case of the CCBs and Joint Stock Banks using time series data from 2000Q1 to 2022Q4. More specifically, it examines the main determinants of loans to households and firms to evaluate the sensitivity of credit behaviour to the economic cycle. In the first stage, Vector Error Correction Models (VECMs) are estimated to identify the long-run relationship between credit and economic variables. In the second one, on the basis of appropriate exogeneity tests. only the credit variables are treated as endogenous, and all others as exogenous. Specifically, Error Correction Models (ECMs) are estimated for both loans to households and loans to firms at the national level as well as from the CCBs and Joint Stock Banks. The third stage of the analysis focuses on credit behaviour during economic recessions. The main findings can be summarized as follows: credit appears to be affected by the business cycle and tends to be pro-cyclical; however, the lending behaviour of the CCBs is less responsive to economic fluctuations,

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namely they tend to reduce credit by less or not at all during economic downturns.

The paper is organized as follows. Section II reviews both the theoretical and empirical literature. Section III describes the data and presents some preliminary statistics. Section IV outlines the empirical methodology and discusses the main results. Section V offers some concluding remarks.

II. Literature review

There exists an extensive literature on the procyclical behaviour of banks which focuses on the impact of macroeconomic fluctuations on their performance. The present paper contributes to this strand by examining the response of credit variables to economic fluctuation and also the lending behaviour of the CCBs and Joint Stock Banks during economic cycles. Procyclicality results from an underestimation or overestimation of the risks faced by the banking sector. This leads to high growth during the upward phase of the cycle, and to sharp falls during downturns which are characterized by strong risk aversion. This constrains the supply of loans owing to banks' concerns about loan portfolio quality and the probability of default. Thus, the banking sector, rather than being an effective mechanism for allocating funds, exacerbates cyclical fluctuations, hindering the efficient allocation of resources in the economy and adversely affecting credit growth and financial stability. According to the Financial Stability Forum, procyclicality can be traced to two fundamental sources. The first one is limitation in risk measurement. Measures of risk and the assumptions underlying risk measurement practices tend to be highly procyclical. Consequently, the level of risk frequently increases when tensions emerge, yet it may remain relatively low even as vulnerabilities and risk accumulate during the expansion phase. The credit risk inherent in trading portfolios is frequently underestimated when assessed over brief holding periods with data that fail to encompass the full credit cycle. This may result in a false sense of security among participants, as was the case prior to the current turmoil. The second source is the distortion of incentives. A primary example is the existence of conflicts of interest between the providers and users of funds, which can be conceptualized as 'principal-agent' issues. Financial contracts are only imperfectly capable of addressing these conflicts. To exemplify, collateral-based lending or margin requirements can safeguard lenders and traders from actions undertaken by borrowers and counterparties that could potentially diminish the value of their claims. However, the establishment of a direct link between asset valuations and funding can result in fluctuations in margin requirements that exacerbate procyclicality.

Various theoretical and empirical studies have attempted to explain this behaviour. On regarding theoretical efforts, Bernanke and Gertler (1989) present a straightforward neoclassical model of the business cycle, wherein the state of borrowers' balance sheets serves as a catalyst for output dynamics. The mechanism in question is that an increase in the net worth of borrowers leads to a reduction in the agency costs associated with the financing of real capital investments. An improvement in net worth, a reduction in agency costs and an increase in investment all contribute to amplifying the effects of a business upturn. Conversely, a downturn in business conditions will have the opposite effect. A shock affecting net worth can initiate fluctuations. Kiyotaki and Moore (1997) construct a model of a dynamic economy in which lenders are unable to impose repayment of debts on borrowers unless the debts are secured. The dynamic interaction between credit limits and asset prices has been identified as a significant transmission mechanism, whereby the effects of shocks persist, amplify and spill over to other sectors.

Bikker and Hu (2002) found a negative correlation between credit growth and the unemployment rate. Other empirical analysis found a positive association between credit growth and GDP fluctuations((Casolaro and Gambacorta (2005) Craig, Davis, and Pascual (2006). Casolaro, Eramo, and Gambacorta (2006), Micco and Panizza (2006), Bouvatier and Lepetit (2008), Fritzer and Reiss (2008)).

Goodhart (2008) investigated the drivers of credit growth in the US and the UK between 1995 and 2005. He found that changes in house prices have a significant positive effect on credit growth in

the UK, but not in the US. Aisen and Franken (2010) estimated the main determinants of bank credit growth during the 2008 financial crisis for a sample of over 80 countries. Their study reveals that the most significant factors contributing to the post-crisis bank credit slowdown were larger bank credit booms before the crisis and the lower GDP growth of trading partners. Olivero, Li, and Jeon (2011) found a positive correlation between changes in loans and GDP growth in 10 Asian and 10 Latin American countries. Goodhart and Hofmann (2008) provided cross-country evidence of a long-term relationship between bank credit, GDP, and residential property prices. Gambacorta and Marques-ibanez (2011) analysed data for the US and 14 European Union member states from 1999 to 2009. They found that changes in banks' business models and market funding patterns had altered the monetary transmission mechanism in Europe and the US before the 2008 crisis, which led to further structural changes. Sanfilippo-azofra et al. (2018) and Beutler et al. (2020) argued that monetary policy is the primary determinant of banks' credit supply. Specifically, expansionary monetary policies stimulate loans, thereby increasing access to banks' loanable funds; conversely, contractionary policies decreasing banks' loan supply hinder borrowers' access to banks' loanable funds (Sanfilippo-azofra et al. 2018).

Our analysis is also related to the literature on the lending behaviour of CCBs and focuses in particular on the impact of economic downturns. The Cooperative Credit Banks (Banche di Credito Cooperativo) have a long history in Italy. The inaugural Cooperative Credit Bank was established 140 years ago in Loreggia. Currently, there are 222 CCBs operating within the Italian territory, comprising 4,089 branches (representing 20.4% of the total number of branches) distributed across 2,516 municipalities and 102 provinces. In 740 municipalities, CCBs are the monopoly provider of banking services. The institutions in question provide loans amounting to 138.9 billion euros, with an estimated funding capability of 195.2 billion euros. A salient feature of CCBs is their engagement in local and regional activities. Indeed, approximately 95% of loans are granted within the same geographical area where savings are collected, with 71% of savings being reinvested into the local real economy. The longevity and consistency of this model are not accidental; rather, they are the result of some specific factors that are essential components of the CCBs model (and of cooperative finance in general). The objective function of CCBs is of particular significance. This is evident from Article 2 of the CCBs Statute, which states: '*Its purpose is to favour members and members of local communities in the bank's operations and services, pursuing the improvement of their moral, cultural and economic conditions, and promoting the development of cooperation and education in savings and welfare, as well as social cohesion and the responsible and sustainable growth of the territory in which it operates*'. In order to operate within such a challenging vision and pursue such a complex objective, it is necessary to be equipped with governance instruments that provide strong incentives and direction in this regard. It can be reasonably argued that corporate governance based on cooperative principles represents the most effective instrument for this purpose. The basic rules of a cooperative, including those relating to capital voting, limits to capital holding, limits to proxies and the election of directors from among the members, have important consequences in terms of favouring the alignment between behaviour and objectives. The optimization of benefits for members, customers and the community is not impeded by the necessity to maximise the return on investment (profit is a constraint rather than an objective; it is essential to increase capitalization and the capacity to expand credit, rather than to remunerate the individual investor). Furthermore, prudent risk-taking is an additional consequence as risk and return on capital are positively correlated. The bank's services are the focus of this solicitation, as the CCB member's interest lies in contributing to their improvement, rather than in the return on their shares. The stability of the institution is guaranteed through the incorporation of the prevailing profits. Furthermore, cooperative governance reinforces the institution's territorial rootedness. Unlike conventional banking institutions, which are capable of relocating, a cooperative bank is not able to do so. Additionally, any mergers or acquisitions by other banks (which can only occur within the same category) follow a different logic than that typically observed in the banking

industry. Furthermore, the selection of directors from among the members reinforces the connection with the territory, reflecting the corporate base. A further crucial element is legislation, namely the set of regulatory and operational constraints that may either facilitate or impede the ability to operate within the selected vision and objective function. Historically, Cooperative Credit has operated within regulatory frameworks that have been designed to support its objective function in a manner that is consistent with the constitutional mandate. The most recent stage in this process is the 2016 reform law (with subsequent amendments in 2018), whose implementation resulted in the creation of the two cooperative banking groups, Iccrea and Cassa Centrale, as well as the Institutional Protection Scheme of the South Tyrolean Raiffeisen Banks, the Raiffeisen Sudtirol IPS. Similarly, Cooperative Credit has devised an innovative model that differs from existing European models and is tailored to the specificities of Italian regulations. Another legal framework that has had an impact on CCBs lending behaviour (and on banks in general) was the Decree Law No. 59 of 2016, that introduced new measures to promote more effective management of NPLs. After this legal innovation CCBs started to experience a reduction in NPLs stocks, that affected net lending.

In the literature, there are several papers that investigate the link between relationship banking and economic cycle and also credit behaviour during recessions of Mutual and Local banks. Ayadi et al. (2009), argue that different models of banks have advantages and disadvantages, whereas there 'is a systemic advantage in having a mixed system of models. Demitri, Gobbi, and Sette (2010) analysed the impact of relationship lending variables on credit growth for firms and found that they mitigate credit contractions. The importance of diversity and of the activity of Cooperative Credit Banks is also acknowledged by the high-level expert group on reforming the structure of the EU-banking sector (Liikanen et al. 2012). Barboni and Rossi (2012) concluded that firms financed by local banks have a lower probability of being credit rationed during a crisis. Gobbi and Sette (2013) showed that firms benefited from closer bank lending relationships after the 2008 crisis, which resulted in higher credit growth and lower interest rates. Presbitero, Udell, and Zazzaro (2014) provided evidence that firms operating in credit markets with a strong presence of 'functionally close banks' experienced less credit rationing compared to those in functionally distant credit markets. Deloof and La Rocca (2015) found that the presence of CCBs is associated with a reduction in the demand for trade credit – a lower dependency on trade credit was crucial in avoiding a credit crunch during the crisis. Beck et al. (2018) reported that while relationship lending is not associated with credit constraints during a credit boom, it alleviates such constraints during a downturn. This positive role of relationship lending is stronger for small and opaque firms and in regions with a more severe economic downturn. Moreover, relationship lending mitigates the impact of a downturn on firm growth and does not constitute evergreening of loans. Flögel and Gärtner (2020) showed that Germany's regional savings and cooperative banks provided liquidity that support business clients to survive the social shutdown and hence cushion the economic impacts of the Covid pandemic.

III. Data and descriptive analysis

Data sources and definitions

The dataset consists of 11 quarterly series covering the period from March 2000 to December 2022, for a total of 92 observations in each case. The sources are the Bank of Italy, Istat (the Italian Office for National Statistics), and the OECD (see Table 1 for a full list of the series and the corresponding source).

The data can be divided into two subsets. The first includes the bank's loan behaviour variables, such as loans to households[1] and loans to firms[2] from all banks (LOAN_HOU_ITA, LOAN_FIR_ITA), from the subset of Italian Cooperative Credit Banks (LOAN_HOU_CCB,

[1]Loans to households is given by the sum of Loans to consumer households (famiglie consumatrici) and loans to productive households (famiglie produttrici).
[2]Loans to firms are referred to Loans to non financial enterprises.

Table 1. List of variables.

Variable	Definition	# Observations	Source
LOAN_HOU_ITA	Loans to households – All banks	92	Bank of Italy
LOAN_FIR_ITA	Loans to firms -All banks	92	Bank of Italy
LOAN_HOU_CCB	Loans to households – CCB	92	Bank of Italy
LOAN_FIR_CCB	Loans to firms – CCB	92	Bank of Italy
LOAN_HOU_OB	Loans to households – OB	92	Bank of Italy
LOAN_FIR_OB	Loans to firms – OB	92	Bank of Italy
GDP	Annualized quarterly GDP	92	Istat
CONS	Annualized quarterly Private Consumption Expenditures	92	Istat
HOUSE	House Price Index	92	OECD
IR_HOU	Interest rate on loans to households	92	Bank of Italy
SPREAD	Difference between the interest rate on loans to firms and the three months interbank interest rate	92	Bank of Italy and Bloomberg

Istat is the Italian Office of National Statistics.

LOAN_FIR_CCB) and from the Joint Stock Banks (LOAN_HOU_OB, LOAN_FIR_OB). The second includes macroeconomic and financial variables, namely: real GDP (GDP – if the lending behaviour of banks is procyclical, a positive association between loans and real GDP growth is expected); real consumption expenditure (CONS – following Casolaro and Gambacorta (2005)), loans to households are expected to be influenced by the level and dynamics of private consumption, which could drive the demand for loans); the real house price index (HOUSE), which is the average price per quarter set equal to 100 in Q4 2015 (an increase in this index may lead to higher demand for loans, particularly for mortgages). The additional variables, which relate to the cost of financing, are the following: the interest rate on loans to households (IR_HOU, which is expected to have a negative relationship with loans to households); the difference between the interest rate on loans to firms and the interbank 3-month interest rate (SPREAD – following Casolaro, Eramo, and Gambacorta (2006), this variable can be seen as an indicator of the cost for the firm of financing investment plans through the banking channel compared to other financing options, such as bond issues).

Descriptive analysis

Figure 1(a) displays the annual rate of change of loans to households from all banks, as well as from the CCBs and Joint Stock Banks from 2001 to 2022. All series experienced high growth rates in the early 2000s. The average annual growth rate for the period 2001–2007 (prior to the Lehman Brothers Crisis) was approximately 9.8% for all banks, over 10% for the CCBs and 9.6% for Joint Stock Banks. Growth became negative during the sovereign debt crisis of 2012. During the Covid period of 2020–2022, state guarantees stimulated loans.

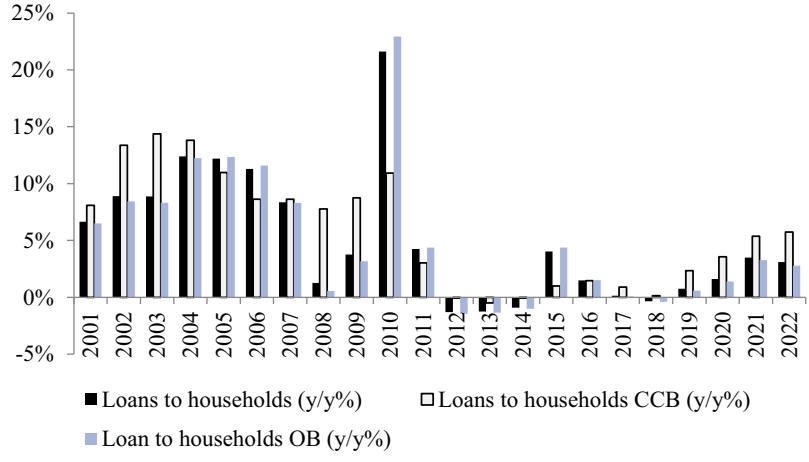

Figure 1a. Loan to households. Annual growth of Loan to Households (National Level, CCB and OB). *Source*: Authors' calculations using data from Bank of Italy.

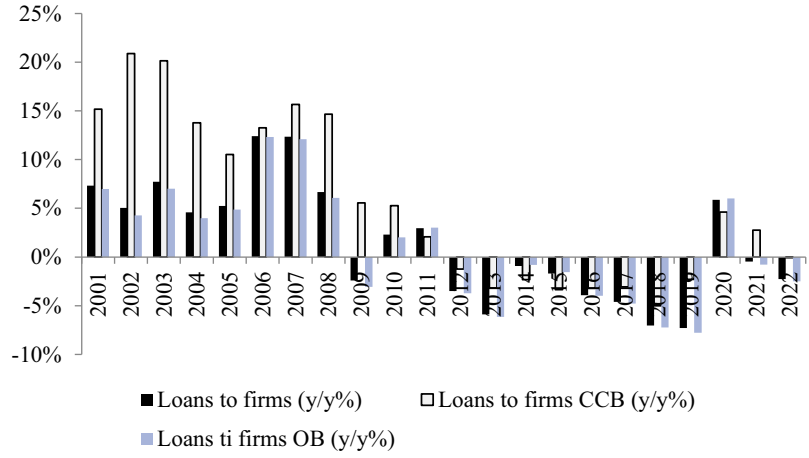

Figure 1b. Loan to Firms. Annual growth of Loan to Firms (National Level, CCB and OB). *Source*: Authors' calculations using data from Bank of Italy.

Figure 1(b) shows the annual rate of change of loans to firms, again for all banks as well as the CCBs and Joint Stocks Banks. It can be seen that growth rates became negative from 2012, indicating that the sovereign debt crisis severely affected loans to private firms. State financial support during the COVID-19 pandemic appears to have sustained credit to non-financial institutions in the period 2020–2021.

Figure 2 shows the annual rate of change of real GDP and consumption. The sample period covers three major recessions that hit the Italian economy. The first followed the collapse of Lehman Brothers. In 2009, Italian real GDP fell by 5.3%, compared with a fall of 0.9% in the previous year. The sovereign debt crisis also hit European countries hard. In Italy, the fall in real GDP in 2012 was 3% points. In 2013 the decline was 1.8%. In the following years, the macroeconomic performance was weak, although GDP growth was still positive. In 2020, the COVID-19 pandemic affected the world economy dramatically. In that year Italian real GDP fell by 9%. Figure 3 shows the dynamics of real house prices in Italy. These exhibited an upward trend in the early 2000s and peaked in 2008. They started to fall after the Lehman crisis, before stabilizing from 2013.

Finally, Figure 4 displays the interest rate variables. From 2000 to 2009, the average value of interest rates on loans to households (firms) was around 6.4% (5.2%), whilst from 2010 to 2022 it was 3.5% (2.7%). From 2015 the interbank interest rate became negative as a result of the ECB's highly expansionary monetary policy. Both interbank and lending

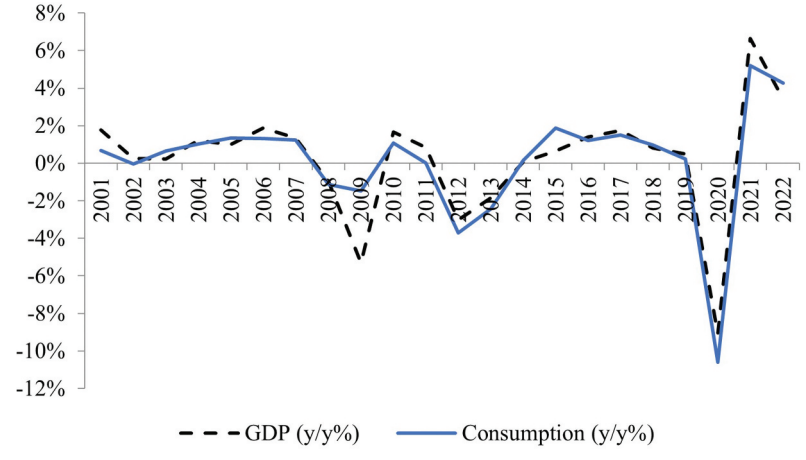

Figure 2. Real GDP and Consumption. Annual growth of Real GDP and Private Consumption. Source: Authors' calculations using data from ISTAT.

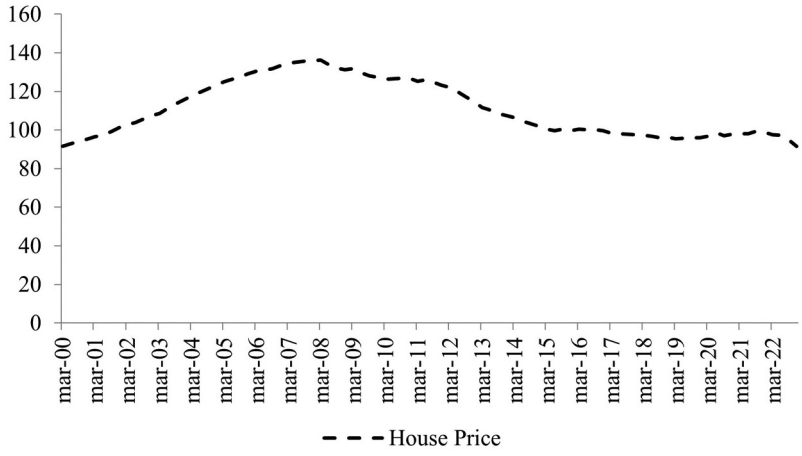

Figure 3. House price. Quarterly data. Index = 100 in 2015. Source: Authors' calculations using data from OECD.

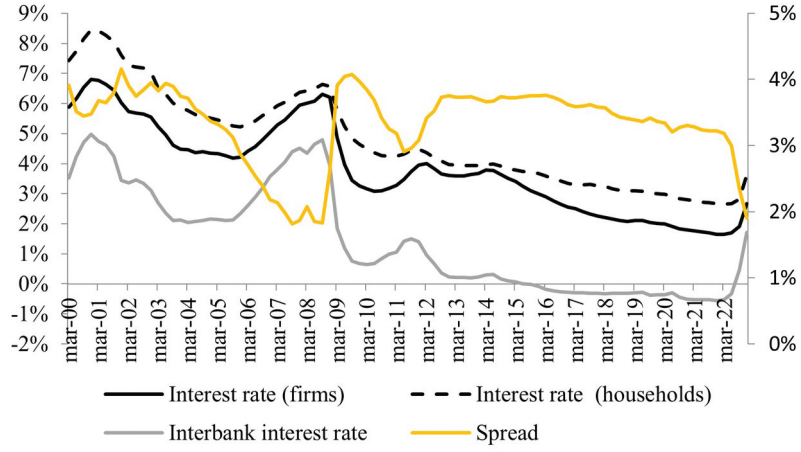

Figure 4. Interest Rates. Quarterly data. Source: Authors' calculations using data from Bank of Italy and Bloomberg.

rates started to increase in 2022, when monetary policy became restrictive in response to the high inflation.

Table 2 presents some descriptive statistics. For the banking sector as a whole, loans to households ranged from 219 to 672 million euro, while loans to enterprises averaged 711 million euro. The index for real house prices reached a maximum of 136.3 in 2007. The average interest rate on loans to households was around 4.7%, while the spread between the interest rate on loans to firms and the three-month interbank interest rate averaged 2.4%.

Table 2. Summary statistics for the main variables.

	Mean	St. Dev	Minimum	Maximum
LOAN_HOU_ITA	496919	144618	219367	672516
LOAN_FIR_ITA	711182	126988	432988	906174
LOAN_HOU_CCB	50225	15442	19939	72261
LOAN_FIR_CCB	55979	17095	18849	75219
LOAN_HOU_OB	446693	129269	199427	600255
LOAN_FIR_OB	655203	111893	414139	831164
GDP	1700059	53927	1413223	1812906
CONS	1021347	32179	858843	1068556
HOUSE	110.94	14.39	91.48	136.30
IR_HOU	0.0476	0.0162	0.0264	0.0844
SPREAD	0.0241	0.0057	0.0096	0.0348

Source: Bank of Italy, Istat, OECD and Bloomberg.
For monetary variables data are expressed in millions of euro.

Table 3. Model specification.

Model (1)			
LOAN_HOU_ITA	CONS	HOUSE	IR_HOU
Model (2)			
LOAN_HOU_CCB	CONS	HOUSE	IR_HOU
Model (3)			
LOAN_HOU_OB	CONS	HOUSE	IR_HOU
Model (4)			
LOAN_FIR_ITA	GDP	SPREAD	
Model (5)			
LOAN_FIR_CCB	GDP	SPREAD	
Model (6)			
LOAN_FIR_OB	GDP	SPREAD	

Source: Bank of Italy, Istat, OECD and Bloomberg.

Table 4. ADF unit root test.

	Levels		First difference	
	Statistic	P – value	Statistic	P – value
LOAN_HOU_ITA	−1.9041	0.3291	−4.1623	0.0013
LOAN_FIR_ITA	−1.7146	0.4205	−3.4560	0.0115
LOAN_HOU_CCB	−1.5092	0.5243	−3.4260	0.0101
LOAN_FIR_CCB	−2.2997	0.4294	−11.6552	0.0001
LOAN_HOU_OB	−2.2944	0.1760	−4.3212	0.0008
LOAN_FIR_OB	−1.5925	0.4822	−3.6514	0.0065
GDP	0.1585	0.7298	−11.3010	0.0000
CONS	0.1240	0.7193	−10.5862	0.0000
HOUSE	−1.1546	0.6908	−6.3390	0.0000
IR_HOU	−2.6812	0.0813	−3.4765	0.0109
SPREAD	−1.1938	0.6743	−3.9669	0.0025

Source: Bank of Italy, Istat, OECD and Bloomberg.

IV. Econometric analysis

The empirical investigation is divided in three parts. In the first one (Baseline Model), all variables are treated as endogenous. Cointegration tests and VECM were estimated in order to verity if there is a long run relationship between credit and economic variables. The motivation behind this first step lies in verifying from an economic point of view the presence of long-term relationships. In the second, six separate equations are estimated in which the credit variables are treated as endogenous and all others as exogenous given the results of the exogeneity tests. In this case, it is possible to justify a unidirectional causal relationship between economic and credit variables, and the estimated coefficients have a precise impact on credit dynamics. The third part focuses on the credit behaviour during economic recessions.

The Baseline Model

Table 3 shows the six different specifications we estimate. The first three models include loans to households from all banks (LOAN_HOU_ITA), from the CCBs (LOAN_HOU_CCB) and from Joint Stock Banks (LOAN_HOU_OB) as well as real consumption expenditure (CONS), the house price index (HOUSE) and the interest rate on loans to households (IR_HOU). Models 4, 5 and 6 include, respectively, loans to enterprises from all banks (LOAN_FIR_ITA), from the CCBs (LOAN_FIR_CCB) and from Joint Stock Banks (LOAN_FIR_OB) in addition to real GDP (GDP) and the interest rate spread (SPREAD). All the variables, with the exception of IR_HOU and SPREAD, are in logarithmic form. The VAR model can be represented as follows:

$$y_t = \mu + \sum_{i=1}^{p} \phi_i y_{t-i} + \varepsilon_t t = 1, \ldots, T \quad (1)$$

Univariate time series analysis suggests that all series are I (1). Tables 4 and 5 summarize the results of the ADF and Phillips-Perron unit root tests for all series. Since all of them are non-stationary, the next step is to test for possible cointegration relationships linking them. The Johansen trace test implies that there is a single cointegrating vector in each of the four different models (see Table 6). [3] Therefore a VECM can be estimated in each case. The lag orders (p) are chosen on the basis of the Schwarz information criterion as well as the autocorrelation analysis of the residuals. The latter also suggests the inclusion of impulse dummy variables.

The results for models 1, 2 and 3 are shown in Table 7. In order to be able to provide an economic interpretation for the long-run relationships, the three cointegrating vectors

Table 5. Phillips- perron unit root test.

	Levels		First difference	
	Statistic	P – value	Statistic	P – value
LOAN_HOU_ITA	−1.8692	0.3453	−6.8195	0.0000
LOAN_FIR_ITA	−2.1978	0.2086	−6.0298	0.0000
LOAN_HOU_CCB	−1.8895	0.3359	−5.2849	0.0000
LOAN_FIR_CCB	−2.7430	0.0708	−4.3571	0.0007
LOAN_HOU_OB	−1.8353	0.3614	−7.1708	0.0000
LOAN_FIR_OB	−2.0812	0.2527	−6.2914	0.0000
GDP	0.2336	0.7519	−11.3261	0.0000
CONS	0.1776	0.7355	−10.7274	0.0000
HOUSE	−1.0271	0.7408	−2.9341	0.0037
IR_HOU	−1.5032	0.5276	−3.1798	0.0245
SPREAD	−1.1959	0.6735	−5.8755	0.0000

Source: Bank of Italy, Istat, OECD and Bloomberg.

[3]Due to the presence of dummy variables, the critical values of the test are to be considered indicative.

Table 6. Johansen cointegration test.

	Eigenvalue	Trace statistic	p- Value
Model (1)			
N° of CE			
None	0.3557	69.5738	0.0017
At most 1	0.1985	30.4375	0.1421
At most 2	0.1088	10.7372	0.4121
At most 3	0.0054	0.4853	0.4860
Model (2)			
N° of CE			
None	0.2850	63.1008	0.0087
At most 1	0.1794	33.2408	0.0765
At most 2	0.1064	15.6412	0.1166
At most 3	0.0612	5.6207	0.1770
Model (3)			
N° of CE			
None	0.5275	108.957	0.0000
At most 1	0.2435	41.4778	0.0692
At most 2	0.1161	16.3626	0.4638
At most 3	0.0566	5.2472	0.5613
Model (4)			
N° of CE			
None	0.4696	77.3344	0.0000
At most 1	0.2009	20.8811	0.0220
At most 2	0.0102	0.9168	0.3383
Model (5)			
N° of CE			
None	0.4712	75.0240	0.0000
At most 1	0.1666	18.3041	0.0515
At most 2	0.0231	2.0823	0.1490
Model (6)			
N° of CE			
None	0.4667	67.3076	0.0000
At most 1	0.0995	11.3445	0.1912
At most 2	0.0223	2.0096	0.1563

Johansen trace test critical values of the test are to be considered indicative Due to the presence of dummy variables.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

corresponding to those three models are rewritten in the following way:

$$LOG(LOAN\_HOU\_ITA) = 0.68 * LOG(CONS) + 0.98 * LOG(HOUSE) - 0.14 * IR\_HOU \quad (2)$$

and:

$$LOG(LOAN\_HOU\_CCB) = 2.41 * LOG(HOUSE) \quad (3)$$

and:

$$LOG(LOAN\_HOU\_OB) = 0.74 * LOG(CONS) + 0.76 * LOG(HOUSE) - 0.15 * IR\_HOU \quad (4)$$

In model 2, the coefficient on LOG(CONS) in the cointegrating vector was not found to be significant in the first round of estimation, so the model was estimated again with a zero restriction on this coefficient.[4] The loading factors were also found not to be significantly different from zero for all equations, with the exception of those on ΔLOG (LOAN_HOU_ITA), ΔLOG(LOAN_HOU_CCB) ΔLOG(LOAN_HOU_OB). In the long run, CCB loans to households do not seem to be affected by consumption, while house prices play a significant role. The sign of the coefficient associated with the interest rate is negative and significant only at the national level and for Joint Stock Banks.

Table 8 shows the results of the VECM estimations for models 4, 5 and 6. The corresponding cointegrating vectors can be rewritten as:

$$LOG(LOAN\_FIR\_ITA) = 1.07 * LOG(GDP) - 0.74 * SPREAD \quad (5)$$

and

$$LOG(LOAN\_FIR\_CCB) = 0.84 * LOG(GDP) - 0.33 * SPREAD \quad (6)$$

and:

$$LOG(LOAN\_FIR\_OB) = 1.10 * LOG(GDP) - 0.94 * SPREAD \quad (7)$$

Loans to firms granted by the CCBs are related in the long run to GDP growth and the interest rate spread. However, the cointegrating coefficient on GDP appears to be smaller than at the national level and for the Joint Stock Banks. Also, in this case the credit behaviour of the CCBs seems to be less sensitive to the business cycle.

It is interesting to carry out a variance decomposition for each of the six models. For model 1 a large percentage of the variance in the medium to long term is explained by the house price index and the interest rate on loans to households. Real final consumption expenditure accounts for a higher percentage of the variance in model 1 and 3 compared to model 2. As for the variance of loans to households from CCBs, a large percentage is associated with the house price index, while the role of the interest rate and real consumption expenditure is rather limited. For models 4, 5 and 6, the

[4]A LR test for binding restrictions was performed.

Table 7. VECM results: Model 1–3.

	Coint. Eq	St.Error	T - statistic	
Model (1)				
LOG(LOAN_HOU_ITA(-1))	1.0000	–	–	
LOG(CONS)(-1))	−0.6891***	[0.0536]	[-12.8370]	
LOG(HOUSE)(-1))	−0.9429***	[0.1632]	[-5.7774]	
IR_HOU(-1)	0.1428***	[0.0139]	[10.2356]	
Error Correction	ΔLOG(LOAN_HOU_ITA)	ΔLOG(CONS))	*ΔLOG(HOUSE)*	*ΔIR_HOU*
Loading Coeff	−0.0405***	0.0000	0.0000	0.0237
Model (2)				
LOG(LOAN_HOU_CCB(-1))	1.0000	–	–	
LOG(CONS)(-1))	0.0000	–	–	
LOG(HOUSE)(-1))	−2.4114***	[0.0831]	[-29.0197]	
IR_HOU(-1)	−0.1207	[0.0870]	[-1.3874]	
Error Correction	ΔLOG(LOAN_HOU_CCB)	ΔLOG(CONS))	*ΔLOG(HOUSE)*	*ΔIR_HOU*
Loading Coeff	−0.0104***	0.0000	0.0000	0.0420
LOG(LOAN_HOU_OB(-1))	1.0000	–	–	
LOG(CONS)(-1))	−0.7448***	[0.0393]	[-18,9273]	
LOG(HOUSE)(-1))	−0.7605***	[0.1192]	[-6.3757]	
IR_HOU(-1)	0.1546***	[0.0100]	[15.3852]	
Error Correction	ΔLOG(LOAN_HOU_OB)	ΔLOG(CONS))	*ΔLOG(HOUSE)*	*ΔIR_HOU*
Loading Coeff	−0.0541***	0.0000	0.0000	−0.0068

Regression techniques is VECM. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

Table 8. VECM results: Model 4–6.

	Coint. Eq	St.Error	T - statistic
Model (4)			
LOG(LOAN_FIR_ITA(-1))	1.0000	–	–
SPREAD(-1)	0.7485***	[0.3579]	[2.0915]
LOG(GDP(-1))	-1.0785***	[0.0651]	[-16.5511]
Error Correction	ΔLOG(LOAN_FIR_ITA)	ΔSPREAD	*ΔLOG(GDP)*
Loading Coeff	-0.0111***	0.0000	0.0000
Model (5)			
LOG(LOAN_FIR_ITA(-1))	1.0000	–	–
SPREAD(-1)	0.3315***	[0.1502]	[2.2064]
LOG(GDP(-1))	-0.8407***	[0.0288]	[-29.1931]
Error Correction	ΔLOG(LOAN_FIR_CCB)	ΔSPREAD	*ΔLOG(GDP)*
Loading Coeff	-0.0260***	0.0000	0.0000
Model (6)			
LOG(LOAN_FIR_OB-1))	1.0000	–	–
SPREAD(-1)	0.9447***	[0.4316]	[2.1883]
LOG(GDP(-1))	-1.1060***	[0.0781]	[-14.1620]
Error Correction	ΔLOG(LOAN_FIR_OB)	ΔSPREAD	*ΔLOG(GDP)*
Loading Coeff	-0.0095***	0.0000	0.0000

Regression techniques is VECM. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

variance explained by real GDP is higher for loans to enterprises for the banking sector as a whole. This is not surprising given the VECM results discussed above.

Single equation estimation

The objective of the first stage (VECMs) was to ascertain whether a long-run relationship existed between the banking and real economy variables. The results revealed the presence of a single vector of cointegration, indicating the existence of a unidirectional long-run economic relationship. A VECM provides insight into the long-run co-movement of variables but does not offer information regarding the causal effect of one variable on another. The results of our VECM estimations indicate that the coefficients of the loading matrix, with the exception of those pertaining to banking variables, are not statistically significant. This suggests that the variables associated with these coefficients may be exogenous. Consequently, we may consider the banking variables to be endogenous, whereas the remaining variables may be treated as exogenous. To test this hypothesis, we conducted an exogeneity test (see Table 9)., which supported our priors. In the second stage, we treated the banking variables as endogenous and performed ECM estimations. In this case, causality is unidirectional.

Table 9. Test for exogeneity.

Variables	
Model1	
LOAN_HOU_ITA	23.0803
CONS	4.1387***
HOUSE	19.3191**
IR_HOU	20.5110**
Model 2	
LOAN_HOU_CCB	24.2801
CONS	3.8374***
HOUSE	12.8222***
IR_HOU	20.1903**
Model 3	
LOAN_HOU_OB	23.0685
CONS	4.0064***
HOUSE	19.1869**
IR_HOU	20.6514**
Model 4	
LOAN_FIR_ITA	18.2762
GDP	4.4788***
SPREAD	3.9542***
Model 5	
LOAN_FIR_CCB	39.2177
GDP	3.3990***
SPREAD	4.4963***
Model 6	
LOAN_FIR_OB	16.4250
GDP	5.0413***
SPREAD	3.9003***

Null Hypothesis: Block exogeneity. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

This allows us to estimate six single equations in which loans to households from all banks (LOAN_HOU_ITA), loans to households from the CCBs (LOAN_HOU_CCB), loans to households from the Joint Stock Banks (LOAN_HOU_OB), loans to firms from all banks (LOAN_FIR_ITA), loans to firms from the CCBs (LOAN_FIR_CCB) and loans to firms from Joint Stock Banks (LOAN_FIR_OB) are treated as endogenous in turn and the other variables as exogenous (see Table 10). In order to identify possible long-run relationships, we specify the six equations as ECMs, namely:

$$\Delta Y_t = \mu + \sum_{i=1}^{n-1} \alpha_i \Delta Y_{t-i} + \sum_{i=0}^{m-1} \sum_{j=1}^{p} \gamma_{j,i} \Delta X_{j,t-i} - \pi \varepsilon_{t-1} + \varepsilon_t \quad (8)$$

Table 10. Single equations specification.

Equation	Dependant Variable	Regressors
1	LOAN_HOU_ITA	CONS, HOUSE, IR_HOU
2	LOAN_HOU_CCB	CONS, HOUSE, IR_HOU
3	LOAN_HOU_OB	CONS, HOUSE, IR_HOU
4	LOAN_FIR_ITA	GDP, SPREAD
5	LOAN_FIR_CCB	GDP, SPREAD
6	LOAN_FIR_OB	GDP, SPREAD

Source: Bank of Italy, Istat, OECD and Bloomberg.

where (8) is a generalization for p number of covariates $X_{j,t}$ and π is the error correction coefficient. All six equations are estimated using the Two Stage Least Square method. Again, a set of impulse and step dummies are included in the regressions. The number of lags is chosen as to avoid serial correlation. All variables, except IR_HOU and SPREAD, are in logarithmic form.

The estimates for Equations 1, 2 and 3 are reported in Table 11. The results for Equation (1) indicate a long-term relationship between loans to households for the banking sector as a whole and the other variables. The loading coefficient, though highly significant, is small (0.03), which implies a slow adjustment process towards the long-term equilibrium in response to exogenous shocks. The long-term coefficient associated with real consumption is 0.702, a value similar to those estimated for the VECM. The variable IR_HOU has an effect both in the short and long run, while the house price index is significant only in the cointegrating relationship. The error correction term was not found to be statistically significant in the equation for CCB loans to households. It appears that changes in the house price index are the only factor influencing the short-run dynamics of this variable, together with the autoregressive component. The results for Joint Stock Banks are quite similar to those for all banks (Equation 3). The long-term coefficient associated with real consumption is 0.71, higher than the value estimated for total lending.

Table 12 shows that the error correction term is significant in all Equation (4), (5) and (6). The long-run coefficient for GDP in Equation (4) is 1.07 and in Equation (6) is 1,09, which is higher than the value estimated for the Equation (5) concerning the CCBs (0.84). This suggests that the credit behaviour of the CCBs is less sensitive to the business cycle, which confirms the VECM results. There is also a lower (and negative) long-term coefficient associated with the SPREAD.

Lending behaviour and recessions

This sub-section focuses on possible asymmetric effects in lending behaviour for the different categories of banks considered in this analysis. Specifically, we investigate the impact of economic

Table 11. ECM estimation results: eq 1–3.

Regressors	Equation (1)	Equation (2)	Equation (3)
Dependent variable: *ΔLOG (LOAN_HOU_ITA), ΔLOG (LOAN_HOU_CCB, ΔLOG (LOAN_HOU_OB)*			
LOG (LOAN_HOU_ITA (-1))	-0.0373***	–	–
LOG (LOAN_HOU_CCB (-1))	–	-0.0056	–
LOG (LOAN_HOU_OB (-1))	–	–	-0.0394***
LOG (CONS(-1))	0.0262***	-0.0018	0.0280***
LOG (HOUSE(-1))	0.0345***	0.0200*	0.0344***
IR_HOU(-1)	-0.0057***	0.0004	-0.0061***
ΔLOG (CONS)	0,0697**	0,0418	0.0711**
ΔLOG (HOUSE)	0.1734*	0.1523	0.1764*
Δ (IR_HOU)	-0.0006	-0.0003	-0.0005
ΔLOG (LOAN_HOU_ITA (-1))	0.0294	–	–
ΔLOG LOAN_HOU_CCB (-1))	-	0.0573	-
ΔLOG LOAN_HOU_OB (-1))	–	–	0.0312
ΔLOG (CONS(-1))	0.0041	0.0106	0.0032**
ΔLOG (HOUSE(-1))	0.0411	0.3062**	0.1764*
Δ (IR_ HOU (-1))	0.0122*	-0.0074	-0.0005
ΔLOG (LOAN_HOU_ITA (-2))	0.0696	–	–
ΔLOG (LOAN_HOU_CCB (-2))	–	0.1964**	–
ΔLOG (LOAN_HOU_OB (-2))	–	–	0.0691
ΔLOG (CONS(-2))	0.0219	-0.0021	0.0219
ΔLOG (HOUSE(-2))	0.0587	-0.0036	0.0610
Δ (IR_ HOU (-2))	-0.0125**	-0.0017;	-0.0136**
Observations	89	89	89
Dummies	Yes	Yes	Yes
R^2	0.9003	0.7800	0.9034
Instruments rank	17	17	17
Durbin - Watson	1.9048	2.0137	1.8764
J - statistic	1.5929	0.7135	1.4945
Prob(J – Statistic)	0.2069	0.3982	0.2215

Regression techniques is Two Stage Least Square. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

Table 12. ECM estimation results: eq 4–6.

Regressors	Equation (4)	Equation (5)	Equation (6)
Dependent variable: *ΔLOG (LOAN_FIR_ITA), ΔLOG (LOAN_FIR_CCB), ΔLOG (LOAN_FIR_OB)*			
LOG (LOAN_FIR_ITA (-1))	-0.0186***	–	–
LOG (LOAN_FIR_CCB (-1))	–	-0.0295***	–
LOG (LOAN_FIR_OB (-1))	–	–	-0.0168**
SPREAD(-1)	-0.0134***	-0.0102***	-0.0139***
LOG (GDP(-1))	0.0200***	0.0249***	0.0183***
Δ (SPREAD)	-0.0088	0.0060	-0.0105
ΔLOG (GDP)	-0.0216	0.0669	-0.0312
ΔLOG (LOAN_FIR_ITA (-1))	0.1533	–	–
ΔLOG (LOAN_FIR_CCB (-1))	–	0.2005***	–
ΔLOG (LOAN_FIR_OB (-1))			0.1364
Δ (SPREAD(-1))	-0.0001	-0.0035	0.0002
ΔLOG (GDP(-1))	-0.0683**	-0.1027	-0.1571**
Observations	89	89	89
Dummies	Yes	Yes	Yes
R^2	0.4246	0.6173	0.4011
Instruments rank	13	13	13
Durbin - Watson	2.0750	2.0016	2.0638
J - statistic	7.4686	2.8191	7.5135
Prob (J – Statistic)	0.1131	0.5885	0.1111

Regression techniques is Two Stage Least Square. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

recessions on credit, which could cause a reduction in loans and credit rationing. During the time period analysed in this work the Italian Economy was hit by three main recessions. The first one followed the Lehman Brothers bankruptcy. The second downturn was related to the Sovereign debt crisis in 2012. Finally, the last recession was a consequence of the COVID-19 pandemic. These three crisis were very different in term of cause and economic consequences. Lehman and Sovereign debt crisis has been originated by the financial market, while the Covid recession was a consequence of the global shutdown and the fall in production and consumption.

Table 13. ECM estimation results: eq 7–9.

Regressors	Equation (7)	Equation (8)	Equation (9)
Dependent variable: *ΔLOG (LOAN_FIR_ITA), ΔLOG (LOAN_FIR_CCB), ΔLOG (LOAN_FIR_OB)*			
LOG (LOAN_HOU_ITA (-1))	-0.0358***	–	–
LOG (LOAN_HOU_CCB (-1))	–	-0.0193	–
LOG (LOAN_HOU_OB (-1))	–	–	-0.0369***
LOG (CONS(-1))	0.0241***	0.0091	0.0246***
LOG (HOUSE(-1))	0.0358***	0.0220*	0.0369***
IR_HOU(-1)	-0.0053***	-0.0023	-0.0055***
ΔLOG(CONS)	0.0685**	0.0512	0.0691**
ΔLOG(HOUSE)	0.1660*	0.1640	0.1624*
Δ (IR_HOU)	-0.0005	0.0013	-0.0013
ΔLOG (LOAN_HOU_ITA (-1))	0.0250	–	–
ΔLOG LOAN_HOU_CCB (-1))	–	0.0052	–
ΔLOG LOAN_HOU_OB (-1))	–	–	0.0233
ΔLOG (CONS(-1))	0.0066	0.0083	0.0075
ΔLOG (HOUSE(-1))	0.0463	0.2915**	0.0349
Δ (IR_ HOU (-1))	0.0114*	-0.0037	0.0137
ΔLOG (LOAN_HOU_ITA (-2))	0.0651	–	–
ΔLOG (LOAN_HOU_CCB (-2))	–	0.1646**	–
ΔLOG (LOAN_HOU_OB (-2))	–	–	0.0613
ΔLOG (CONS(-2))	0.0238	-0.0026	0.0252
ΔLOG (HOUSE(-2))	0.0645	0.0044	0.0708
Δ (IR_ HOU (-2))	-0.0117**	-0.0055	-0.0122**
CRISIS_2008	-0.0022	0.0109**	-0.0040
Observations	89	89	89
Dummies	Yes	Yes	Yes
R^2	0.9008	0.7800	0,904893
Instruments rank	17	17	17
Durbin - Watson	1,8885	2.0137	1.8606
J - statistic	1.3804	0.7135	1.1562
Prob (J – Statistic)	0.2400	0.3982	0.2822

Regression techniques is Two Stage Least Square. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

Table 14. ECM estimation results: eq 10–12.

Regressors	Equation (10)	Equation (11)	Equation (12)
Dependent variable: *ΔLOG(LOAN_FIR_ITA), ΔLOG(LOAN_FIR_CCB), ΔLOG(LOAN_FIR_OB)*			
LOG(LOAN_FIR_ITA (-1))	-0.0174***	–	–
LOG(LOAN_FIR_CCB (-1))	–	-0.0315***	–
LOG(LOAN_FIR_OB (-1))	–	–	-0.0147**
SPREAD(-1)	-0.0139***	-0.0089***	-0.0148***
LOG(GDP(-1))	0.0189***	0.0262***	0.0165***
Δ(SPREAD)	-0.0086	0.0049	-0.0102
ΔLOG(GDP)	-0.0246	0.0769	-0.0358
ΔLOG(LOAN_FIR_ITA (-1))	0.1525	–	–
ΔLOG(LOAN_FIR_CCB (-1))	–	0.1861*	–
ΔLOG(LOAN_FIR_OB (-1))	–	–	0.1342
Δ(SPREAD(-1))	0.0016	-0.0094	0.0028
ΔLOG(GDP(-1))	-0.1549**	-0.0909	-0.1611***
CRISIS_2008	-0.0029	0.0101	-0.0032
Observations	89	89	89
Dummies	Yes	Yes	Yes
R^2	0.4253	0.6235	0.4027
Instruments rank	13	13	13
Durbin - Watson	2.0802	1.9938	2.0712
J - statistic	7.5580	2.2421	6.6793
Prob(J – Statistic)	0.1091	0.6913	0.1538

Regression techniques is Two Stage Least Square. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

We introduce three dummy variables (CRISIS_2008, CRISIS_2012 and COVID) which take the value of 1 in quarters with negative GDP growth and 0 otherwise. We then estimate Equation from (1) to (6) again, including the variables CRISIS_2008, CRISIS_2012 and COVID separately (Equations from (7) to (25)). The results (see Tables 13-18) indicate that CCBs did not reduce credit during recessions. Instead they increased loans to households during the financial crisis of 2008. This

Table 15. ECM estimation results: eq 13–15.

Regressors	Equation (13)	Equation (14)	Equation (15)
Dependent variable: *ΔLOG(LOAN_HOU_ITA), ΔLOG(LOAN_HOU_CCB,ΔLOG(LOAN_HOU_OB)*			
LOG(LOAN_HOU_ITA (-1))	-0.0403***	–	–
LOG(LOAN_HOU_CCB (-1))	–	-0.0145	–
LOG(LOAN_HOU_OB (-1))	–	–	-0.0416***
LOG(CONS(-1))	0.0283***	0.0031	0.0295***
LOG(HOUSE(-1))	0.0370***	0.0273**	0.0364***
IR_HOU(-1)	-0.0061***	-0.0009	-0.0064***
ΔLOG(CONS)	0.0576*	0.0278	0.0607**
ΔLOG(HOUSE)	0.1297	0.0824	0.1399
Δ(IR_HOU)	-0.0008	-0.0020	-0.0011
ΔLOG(LOAN_HOU_ITA (-1))	0.0264	–	–
ΔLOG LOAN_HOU_CCB (-1))	–	0.0227	–
ΔLOG LOAN_HOU_OB (-1))	–	–	0.0294
ΔLOG(CONS(-1))	-0.0037	0.0012	-0.0035
ΔLOG(HOUSE(-1))	0.0331	0.2814**	0.0197
Δ(IR_ HOU (-1))	0.0132*	-0.0062	0.0158*
ΔLOG(LOAN_HOU_ITA (-2))	0.0647	–	–
ΔLOG(LOAN_HOU_CCB (-2))	–	0.1755 **	–
ΔLOG(LOAN_HOU_OB (-2))	–	–	0.0660
ΔLOG(CONS(-2))	0.0098	-0.0153	0.0115
ΔLOG(HOUSE(-2))	0.0265	-0.0353	0.0336
Δ(IR_ HOU (-2))	-0.0121**	-0.0009	-0.0134**
CRISIS_2012	-0.0043**	-0.0054	-0,0037**
Observations	89	89	89
Dummies	Yes	Yes	Yes
R^2	0.9008	0.7883	0.9059
Instruments rank	17	17	17
Durbin - Watson	1.8885	1.9904	1.8957
J - statistic	1.3804	1.5051	2.1437
Prob(J – Statistic)	0.2400	02198	0.1431

Regression techniques is Two Stage Least Square. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

Table 16. ECM estimation results: eq 17–19.

Regressors	Equation (17)	Equation (18)	Equation (19)
Dependent variable: *ΔLOG(LOAN_HOU_ITA), ΔLOG(LOAN_HOU_CCB,ΔLOG(LOAN_HOU_OB)*			
LOG(LOAN_FIR_ITA (-1))	-0.0177*	–	–
LOG(LOAN_FIR_CCB (-1))	–	-0.0295***	–
LOG(LOAN_FIR_OB (-1))	–	–	-0.0156**
SPREAD(-1)	-0.0132***	-0.0102***	-0.0137***
LOG(GDP(-1))	0,0191**	0.0249***	0.0171***
Δ(SPREAD)	-0.0079	0.0060	-0.0095
ΔLOG(GDP)	-0.0228	0.0669	-0.0327
ΔLOG(LOAN_FIR_ITA (-1))	0.1529	–	–
ΔLOG(LOAN_FIR_CCB (-1))	–	0.2005**	–
ΔLOG(LOAN_FIR_OB (-1))	–	–	0.1358
Δ(SPREAD(-1))	0.0002	-0.0035	0.0005
ΔLOG(GDP(-1))	-0.1527**	-0.1027	-0.1576***
CRISIS_2012	-0.0019	0.0001	-0.0023
Observations	89	89	89
Dummies	Yes	Yes	Yes
R^2	0.4252	0.6173	0.4020
Instruments rank	13	13	13
Durbin - Watson	2.0771	2.0016	2.0666
J - statistic	7.4379	2.7898	6.5915
Prob(J – Statistic)	0.1144	0.5935	0.1591

Regression techniques is Two Stage Least Square. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

result is line with the findings reported by Gobbi and Sette (2013). By contrast, Joint Stock Banks reduced credit during the Sovereign debt crisis of 2012. Recessions may have a detrimental effect on credit, especially in countries such as Italy where bank credit is the primary source of external financing for the productive sector. In this context, Cooperative Credit Banks may have experienced

Table 17. ECM estimation results: eq 20–22.

Regressors	Equation (20)	Equation (21)	Equation (22)
Dependent variable: *ΔLOG(LOAN_HOU_ITA), ΔLOG(LOAN_HOU_CCB,ΔLOG(LOAN_HOU_OB)*			
LOG(LOAN_HOU_ITA (-1))	-0.0375***	–	–
LOG(LOAN_HOU_CCB (-1))	–	-0.0078	–
LOG(LOAN_HOU_OB (-1))	–	–	-0.0392***
LOG(CONS(-1))	0.0263***	-0.0009	0.0279***
LOG(HOUSE(-1))	0.0346***	0.0223	0.0342***
		**	
IR_HOU(-1)	-0.0057***	0.0002	-0.0061***
ΔLOG(CONS)	0.0718*	0.0559	0.0690*
ΔLOG(HOUSE)	0.1724*	0.1452	0.1774
Δ(IR_HOU)	-0.0001	-0.0008	-0.0004
ΔLOG(LOAN_HOU_ITA (-1))	0.0296	–	–
ΔLOG LOAN_HOU_CCB (-1))	–	0.0453	–
ΔLOG LOAN_HOU_OB (-1))	–	–	0.0310
ΔLOG(CONS(-1))	0.0057	0.0215	0.0016
ΔLOG(HOUSE(-1))	0.0383	0.2900**	0.0287
Δ(IR_ HOU (-1))	0.0122*	-0.0074	0.0150**
ΔLOG(LOAN_HOU_ITA (-2))	0.0695	–	–
ΔLOG(LOAN_HOU_CCB (-2))	–	0.1878**	–
ΔLOG(LOAN_HOU_OB (-2))	–	–	0.0691
ΔLOG(CONS(-2))	0.0249	0.0166	0.0190
ΔLOG(HOUSE(-2))	0.0568	-0.0094	0.0629
Δ(IR_ HOU (-2))	-0.0124**	-0.0016	-0.0137**
CRISIS_COVID	0.0004	0.0028	-0.0004
Observations	89	89	89
Dummies	Yes	Yes	Yes
R^2	0.9008	0.7808	0.9034
Instruments rank	17	17	17
Durbin - Watson	1.8885	2.0209	1.8714
J - statistic	1.3804	1.5051	1.6025
Prob(J – Statistic)	0.2400	0.5686	0.2055

Regression techniques is Two Stage Least Square. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

Table 18. ECM estimation results: eq 23–25.

Regressors	Equation (23)	Equation (24)	Equation (25)
Dependent variable: *ΔLOG(LOAN_FIR_ITA), ΔLOG(LOAN_FIR_CCB), ΔLOG(LOAN_FIR_OB)*			
LOG(LOAN_FIR_ITA (-1))	-0.0189*	–	–
LOG(LOAN_FIR_CCB (-1))	–	-0.0294***	–
LOG(LOAN_FIR_OB (-1))	–	–	-0.0173**
SPREAD(-1)	-0.0134***	-0.0104***	-0.0140***
LOG(GDP(-1))	0.0203**	0.0248***	0.0187***
Δ(SPREAD)	-0.0089	0.0059	-0.0106
ΔLOG(GDP)	-0.0279	0.0622	-0.0374
ΔLOG(LOAN_FIR_ITA (-1))	0.1521	–	–
ΔLOG(LOAN_FIR_CCB (-1))	–	0.1995**	–
ΔLOG(LOAN_FIR_OB (-1))	–	–	0.1356
Δ(SPREAD(-1))	-0.0003	-0.0037	0.0001
ΔLOG(GDP(-1))	-0.1578**	-0.1066	-0.1628***
CRISIS_COVID	-0.0030	-0.0023	-0.0030
Observations	89	89	89
Dummies	Yes	Yes	Yes
R^2	0.4258	0.6178	0.4023
Instruments rank	13	13	13
Durbin - Watson	2.0768	1.9969	2.0664
J - statistic	7.6575	3.1546	6.8904
Prob(J – Statistic)	0.1049	0.5322	0.1417

Regression techniques is Two Stage Least Square. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

different dynamics in terms of lending, avoiding or limiting credit rationing. This is due to their intermediation model, which is more oriented towards relationship lending, and their informational advantages resulting from their direct knowledge of the business structure and the establishment of long-term credit relationships.

Small cooperative banks, in fact, do not distribute profits and are required by law to provide credit in their area. This business model facilitates

proximity to customers, which has been shown by a recent study (Alessandri and Bottero 2017) to reduce uncertainty shocks (often coinciding with periods of crisis). The large market share of the CCBs in some categories of loans to firms (and in loans to households) makes their countercyclical performance relevant from a macroeconomic point of view. Barone, DE Blasio, and Mocetti (2016) analysed the relationship between an innovative credit supply index at the local level and local value added over the period from 2008 to 2011. Their results indicate that the decline in credit supply explains about 13% of the reduction in value added that occurred during the crisis. This effect is also present for employment, although the elasticity is less pronounced in this case. It is also worth noting that the effect of the reduction in the supply of credit is more pronounced for small firms and for those sectors (manufacturing and services) and provinces (in the Centre and the North) that are more dependent on external sources of finance. Berton et al. (2017) analysed a granular database containing information on labour contracts, firms and lending banks for the Veneto region for two hundred thousand firms over the period from 2008 to 2012. Their estimates suggest that a 10% reduction in credit supply led to a 3.6% fall in employment. Our results are also similar to Flögel and Hejnová (2021), who found a different response of the banking system to the 2008 global financial crisis and the Covid shock. As we argued earlier, CCBs provided countercyclical credit during the 2008 crisis, while there was no increase in credit supply during the Covid pandemic shock. One possible explanation is that during the Covid crisis in Italy there was a large injection of liquidity by the government, which supported firms during and after the lockdown. This government aid effectively sterilized the role of banks in providing liquidity to the economic system, as was the case in the 2008 crisis.

V. Conclusions

This study examines the main determinants of loans to households and firms in the Italian banking system as a whole and in the case of the Cooperative Credit Banks (CCBs) and Joint Stock Banks using time series data from 2000Q1 to 2022Q4. The analysis involves estimating VECMs to identify the long-run relationship between credit and economic variables. The results indicate that, in the long run, consumption does not affect CCBs loans to households, although it has a statistically significant effect for all banks and for Joint Stock Banks. House prices, on the other hand, play a significant role. The coefficient on the interest rate is negative and significant only for the banking sector as a whole and for Joint Stock Banks. Loans granted by the CCBs to firms are related in the long run to GDP growth and the interest rate spread. However, the coefficient on GDP in the cointegrating vector is smaller than the corresponding one for all banks and for Joint Stock Banks. The results from the ECM estimation are consistent with the VECM ones. CCBs lending behaviour seem to be less sensitive to economic fluctuations in comparison to Joint Stock Banks. Finally, the obtained evidence suggests that the CCBs do not tend to reduce credit during economic downturns. In particular, they expanded loans to households in 2008, in contrast with Joint Stock Banks that instead reduced credit during the Sovereign debt crisis in 2012. One possible explanation is that cooperative banks establish long-term relationships with firms, entrepreneurs, households, and local communities through relationship lending. Over time, they acquire an increased amount of (soft) information about each borrower and their relevant markets. Cooperative banks can use this approach to reduce information asymmetries that often lead to credit rationing, especially during economic downturns.

Our findings have importance policy implications. Specifically, they suggest that policy makers should encourage a diversified banking sector including local banks operating under cooperative governance, since this reduces the impact of the credit crunch that often characterizes economic downturns. The impact of a financial crisis on the real economy is therefore likely to be reduced if the banking system includes a sufficient number of banks such as CCBs that focus on relationship lending, with firms actively seeking long-term banking relationships.

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